

# ***Ambient Air Monitoring Report***

**Rivermines  
Park Hills, Missouri**

***Prepared for  
The Doe Run Company***

***September 2012***

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# ***Ambient Air Monitoring Report***

***Rivermines  
Park Hills, Missouri***

***Prepared for  
The Doe Run Company***

***September 2012***



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Jefferson City, MO 65109  
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December 20, 2012

Mr. Mark Nations  
The Doe Run Company  
P.O. Box 1633  
Desloge, Missouri 63601

**Re: Ambient Air Monitoring Report – Rivermines Site**

Dear Mr. Nations:

Please find attached the September 2012 “*Ambient Air Monitoring Report*” for The Doe Run Company at the Rivermines Sites, located near Park Hills, Missouri.

This report will include the following:

- **Glossary of Terms** – Listing of the abbreviations used for each parameter and unit.
- **Ambient Air Quality Standards** – Lists the maximum allowable concentrations for the measured parameters.
- **TSP, Lead & PM<sub>10</sub> Particulate Summaries** – Includes the averages of each monitored parameter, which relates to the federal standards.
- **Particulate and Lead Analysis Spreadsheets**.
- **Lab Results (lead & cadmium)** – Lab reports from Inovatia Laboratories, LLC.
- **Meteorological Data Printouts** – This supplies printouts of each parameter.

Barr Engineering Company offers this report as an independent laboratory. This includes the weighing of filters, obtaining lead and cadmium analysis, compiling the data, and preparing the report. No interpretation of the data or analysis of the results is implied or intended. Should you have any questions regarding this report, please call.

Respectfully,



Richard J. Campbell, PE  
Chemical Engineer  
Senior Environmental Consultant

c: Kathy Rangen  
Jason Gunter  
Ty Morris

## GLOSSARY OF TERMS

mg/m <sup>3</sup>	Micrograms per Cubic Meter
mph	Miles per Hour
Wind Direction	Degrees from True North
TSP	Total Suspended Particulate
PM <sub>10</sub>	Particulate Matter - 10 Microns or Less
mmHg	Millimeters of Mercury

## NATIONAL AMBIENT AIR QUALITY STANDARDS (NAAQS)

PM <sub>10</sub> – Particulate Matter	24-Hour*	Annual Maximum	150 mg/m <sup>3</sup>
Lead	Calendar Quarter	Arithmetic Mean	1.5 mg/m <sup>3</sup>
Lead	Rolling 3-Month Average	Arithmetic Mean	0.15 mg/m <sup>3</sup>

TSP (Total Suspended Particulate) – There are no Federal Standards that apply solely for TSP.

\*This standard must be exceeded more than once a year to constitute a violation.



## TSP and Lead Concentration Summary

Rivermines  
Park Hills, Missouri

2012

Date	TSP Big River #4 ( $\mu\text{g}/\text{m}^3$ )	TSP South #1 ( $\mu\text{g}/\text{m}^3$ )	TSP North #2 ( $\mu\text{g}/\text{m}^3$ )	TSP East #3 ( $\mu\text{g}/\text{m}^3$ )	LEAD Big River #4 ( $\mu\text{g}/\text{m}^3$ )	LEAD South #1 ( $\mu\text{g}/\text{m}^3$ )	LEAD North #2 ( $\mu\text{g}/\text{m}^3$ )	LEAD East #3 ( $\mu\text{g}/\text{m}^3$ )
9/4/12	34	44	27	30	0.013	0.031	0.000	0.008
9/5/12	37	36	27	32	0.048	0.064	0.022	0.010
9/6/12	33	26	24	27	0.015	0.024	0.041	0.011
9/7/12	20	17	17	17	0.000	0.000	0.015	0.000
9/10/12	28	16	12	19	0.032	0.020	0.009	0.009
9/11/12	41	20	18	19	0.049	0.000	0.017	0.008
9/12/12	33	25	23	27	0.017	0.006	0.033	0.019
9/13/12	37	31	29	33	0.010	0.019	0.006	0.011
9/14/12	38	26	21	19	0.012	0.015	0.006	0.006
9/17/12	19	53	12	22	0.013	0.109	0.000	0.022
9/18/12	31	61	9	11	0.048	0.286	0.000	0.017
9/19/12	22	18	27	17	0.010	0.006	0.105	0.008
9/20/12	68	64	32	36	0.071	0.049	0.010	0.038
9/21/12	32	34	35	31	0.011	0.011	0.090	0.012
9/24/12	29	49	27	26	0.016	0.145	0.076	0.009
9/25/12	32	34	30	29	0.016	0.020	0.067	0.018
9/26/12	11	11	11	13	0.006	0.012	0.009	0.000
9/27/12	26	INVALID	25	26	0.008	INVALID	0.000	0.000
9/28/12	27	34	27	25	0.038	0.038	0.032	0.022
Monthly Average	31	33	23	24	0.023	0.048	0.028	0.012
Aug 2012					0.027	0.145	0.028	0.037
Jul 2012					0.035	0.069	0.026	0.034
Rolling 3-month Average					0.03	0.09	0.03	0.03
					3-month Average Lead NAAQS $\mu\text{g}/\text{m}^3$			
								0.15

Please see the particulate analysis sheets for explanations of missing or invalid data.

Note: A summary of the Big River #4 sampler data is also included, because it was part of the QA plan.



## Particulate Summary

### Rivermines Park Hills, Missouri

2012

Date	PM <sub>10</sub> Big River #4 ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> South #1 ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> North #2 ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> East #3 ( $\mu\text{g}/\text{m}^3$ )	PM <sub>10</sub> NAAQS ( $\mu\text{g}/\text{m}^3$ )
6-Sep	21	17	18	18	150
9-Sep	7	8	7	9	150
12-Sep	21	17	16	16	150
15-Sep	12	12	11	12	150
18-Sep	10	37	6	6	150
21-Sep	INVALID	16	19	15	150
24-Sep	19	28	20	19	150
27-Sep	15	INVALID	17	16	150
30-Sep	21	23	23	21	150
Monthly Average	16	20	15	15	

Please see the particulate analysis sheets for explanations of missing or invalid data.

Note: A summary of the Big River #4 sampler data is also included, because it was part of the QA plan.



## TSP and Lead Analysis

The Doe Run Company

SAMPLER ID P4557

Big River Site #4- Primary

Sample Date 2012	Filter ID	TSP Filter Net Wt. g	Lead Total Wt. $\mu\text{g}$	$T_{av}$ C	$P_{av}$ mmHg	$P_f$ mmHg	Ratio $P_o/P_s$	$Q_s$ $\text{m}^3/\text{min}$	$Q_{std}$ $\text{m}^3/\text{min}$	Elapsed Time hr	Sample Volume $V_{std}$ $\text{m}^3$	Mass Concentrations TSP $\mu\text{g}/\text{m}^3$	Lead $\mu\text{g}/\text{m}^3$
9/4/2012	8611209	0.0586	23	26	741.5	36.3	0.951	1.248	1.212	23.68	1721	34	0.013
9/5/2012	8614000	0.0641	83	26	740.3	36.3	0.951	1.247	1.211	23.72	1724	37	0.048
9/6/2012	8613990	0.0565	27	24	742.5	36.0	0.952	1.243	1.220	23.65	1731	33	0.015
9/7/2012	8613982	0.0355	< 10	23	740.0	35.9	0.951	1.242	1.217	23.71	1731	20	0.000
9/10/2012	8613972	0.0478	55	18	748.1	35.3	0.953	1.234	1.245	23.19	1732	28	0.032
9/11/2012	8613962	0.0724	87	19	747.6	35.5	0.953	1.237	1.240	23.69	1763	41	0.049
9/12/2012	8613953	0.0579	29	20	748.1	35.6	0.952	1.239	1.239	23.65	1758	33	0.017
9/13/2012	8613941	0.0646	18	20	749.3	35.6	0.953	1.239	1.241	23.71	1765	37	0.010
9/14/2012	8613934	0.0672	21	15	751.5	35.0	0.953	1.231	1.257	23.45	1769	38	0.012
9/17/2012	8613924	0.0335	22	20	741.2	35.6	0.952	1.238	1.227	23.70	1744	19	0.013
9/18/2012	8613916	0.0538	85	14	744.1	34.8	0.953	1.228	1.248	23.52	1761	31	0.048
9/19/2012	8613906	0.0385	18	15	746.1	35.0	0.953	1.231	1.247	23.62	1767	22	0.010
9/20/2012	8615097	0.1189	124	19	744.0	35.4	0.952	1.236	1.235	23.49	1741	68	0.071
9/21/2012	8615087	0.0549	20	19	741.5	35.4	0.952	1.236	1.230	23.54	1738	32	0.011
9/24/2012	8615078	0.0524	28	14	747.7	34.8	0.953	1.228	1.255	23.70	1784	29	0.018
9/25/2012	8615068	0.0548	28	25	741.9	36.1	0.951	1.245	1.217	23.70	1730	32	0.016
9/26/2012	8615060	0.0186	10	19	744.8	35.5	0.952	1.237	1.235	23.63	1751	11	0.006
9/27/2012	8615049	0.0454	14	19	747.2	35.4	0.953	1.237	1.240	23.71	1764	26	0.008
9/28/2012	8615040	0.0482	68	16	747.4	35.1	0.953	1.232	1.247	23.74	1777	27	0.038

Data Captured	TSP	Lead
Valid Samples:	19	19
Scheduled Samples:	19	19
Percent Data Captured:	100%	100%

Monthly Average:	31	0.023
Standard Deviation:	12	0.019
Maximum:	68	0.071
Minimum:	11	0.000

### NOTES

9/3/2012 - Holiday - No samples scheduled

### DEFINITIONS and CALCULATIONS

$T_{av}$  = average temperature in degrees Celsius  
 $P_{av}$  = average station pressure in millimeters of mercury  
 $P_f$  =  $((\text{Temp in } ^\circ\text{K} * \text{Temp Slope}) + \text{Temp Int.}) * 1.868$   
 $P_i$  =  $((\text{Temp in } ^\circ\text{K} * 0.0664) + (-0.4213)) * 1.868$   
 $P_o/P_s$  = pressure ratio of  $P_f$  and  $P_{av}$  =  $1 - P_f/P_{av}$

$Q_s$  = look up table volumetric flow rate  
 $Q_{std}$  = total sample volumetric flow rate corrected to standard conditions  
 $V_{std}$  = total sample volume corrected to standard conditions  
TSP = mass concentration in  $\mu\text{g}/\text{std m}^3$   
Lead = mass concentration in  $\mu\text{g}/\text{std m}^3$

## ***Particulate and Lead Analysis***



## TSP and Lead Analysis

The Doe Run Company

SAMPLER ID P2940								Elvins Rivermines Site #1 by Office					
Sample Date 2012	Filter ID	TSP Filter Net Wt. g	Lead Total Wt. μg	T <sub>a</sub> C	P <sub>a</sub> mmHg	P <sub>t</sub> mmHg	Ratio P <sub>t</sub> /P <sub>a</sub>	Q <sub>s</sub> m <sup>3</sup> /min	Q <sub>std</sub> m <sup>3</sup> /min	Elapsed Time hr	Sample Volume V <sub>std</sub> m <sup>3</sup>	Mass Concentrations TSP μg/m <sup>3</sup>	Lead μg/m <sup>3</sup>
9/4/2012	8611206	0.0759	55	26	741.5	36.3	0.951	1.254	1.217	23.78	1738	44	0.031
9/5/2012	8613997	0.0633	110	26	740.3	36.3	0.951	1.253	1.218	23.77	1735	36	0.064
9/6/2012	8613987	0.0463	43	24	742.5	36.0	0.952	1.249	1.226	23.86	1755	26	0.024
9/7/2012	8613979	0.0296	< 10	23	740.0	35.9	0.951	1.248	1.222	23.91	1754	17	0.000
9/10/2012	8613969	0.0275	36	18	748.1	35.3	0.953	1.240	1.251	23.41	1757	16	0.020
9/11/2012	8613959	0.0351	< 10	19	747.6	35.5	0.953	1.243	1.245	23.76	1775	20	0.000
9/12/2012	8613950	0.0432	11	20	748.1	35.6	0.952	1.244	1.244	23.64	1764	25	0.008
9/13/2012	8613944	0.0539	34	20	749.3	35.6	0.953	1.244	1.246	23.52	1758	31	0.019
9/14/2012	8613931	0.0477	26	15	751.5	35.0	0.953	1.238	1.263	23.82	1805	26	0.015
9/17/2012	8613921	0.0937	191	20	741.2	35.8	0.952	1.243	1.232	23.72	1753	53	0.109
9/18/2012	8613913	0.1093	511	14	744.1	34.8	0.953	1.233	1.254	23.73	1785	61	0.286
9/19/2012	8613903	0.0323	11	15	746.1	35.0	0.953	1.236	1.253	23.96	1801	18	0.006
9/20/2012	8615094	0.1130	87	19	744.0	35.4	0.952	1.241	1.240	23.56	1753	64	0.049
9/21/2012	8615088	0.0610	20	19	741.5	35.4	0.952	1.241	1.236	24.10	1787	34	0.011
9/24/2012	8615075	0.0882	262	14	747.7	34.8	0.953	1.233	1.260	23.89	1807	49	0.145
9/25/2012	8615065	0.0590	35	25	741.9	36.1	0.951	1.251	1.222	23.88	1751	34	0.020
9/26/2012	8615057	0.0202	21	19	744.8	35.5	0.952	1.242	1.240	23.81	1772	11	0.012
9/27/2012	8615046	0.0057	< 10	19	747.2	35.4	0.953	1.242	1.245	2.02	151	INVALID	INVALID
9/28/2012	8615037	0.0604	68	16	747.4	35.1	0.953	1.238	1.253	23.79	1789	34	0.038
<b>Data Captured</b>	<b>TSP</b>	<b>Lead</b>											
Valid Samples:	18	18											
Scheduled Samples:	19	19											
Percent Data Captured:	95%	95%											
<b>Monthly Average:</b>	<b>33</b>	<b>0.048</b>											
Standard Deviation:	16	0.071											
Maximum:	64	0.286											
Minimum:	11	0.000											

### NOTES

9/3/2012 - Holiday - No samples scheduled

9/27/2012 - INVALID - Electrical Failure Due to Weather

### DEFINITIONS and CALCULATIONS

T<sub>a</sub> = average temperature in degrees Celsius

P<sub>a</sub> = average station pressure in millimeters of mercury

P<sub>t</sub> = ((Temp in °Kelvin \* Temp Slope)+Temp Int.)\*1.868

P<sub>t</sub> = ((Temp in °Kelvin \* 0.0664)+(-0.4213))\*1.868

P<sub>t</sub>/P<sub>a</sub> = pressure ratio of P<sub>t</sub> and P<sub>a</sub> = 1 - P<sub>t</sub>/P<sub>a</sub>

Q<sub>s</sub> = look up table volumetric flow rate

Q<sub>std</sub> = total sample volumetric flow rate corrected to standard conditions

V<sub>std</sub> = total sample volume corrected to standard conditions

TSP = mass concentration in μg/std m<sup>3</sup>

Lead = mass concentration in μg/std m<sup>3</sup>







## TSP and Lead Analysis

The Doe Run Company

SAMPLER ID P6609

Big River Site #4 - QA

Sample Date 2012	Filter ID	TSP Filter Net Wt. g	Lead Total Wt. $\mu\text{g}$	$T_{av}$ C	$P_{av}$ mmHg	$P_f$ mmHg	Ratio $P_f/P_{av}$	$Q_a$ $\text{m}^3/\text{min}$	$Q_{std}$ $\text{m}^3/\text{min}$	Elapsed Time hr	Sample Volume $V_{std}$ $\text{m}^3$	Mass Concentrations TSP $\mu\text{g}/\text{m}^3$	Lead $\mu\text{g}/\text{m}^3$
9/4/2012	8611210	0.0609	22	26	741.5	36.3	0.951	1.239	1.203	23.57	1701	36	0.013
9/6/2012	8613991	0.0590	28	24	742.5	36.0	0.952	1.235	1.212	23.62	1718	34	0.017
9/11/2012	8613973	0.0725	82	19	747.6	35.5	0.953	1.229	1.231	23.62	1745	42	0.047
9/13/2012	8613940	0.0656	18	20	749.3	35.6	0.953	1.230	1.232	23.69	1751	37	0.010
9/18/2012	8613925	0.0554	82	14	744.1	34.8	0.953	1.219	1.239	23.58	1753	32	0.047
9/20/2012	8615100	0.1123	135	19	744.0	35.4	0.952	1.227	1.226	23.49	1729	65	0.078
9/25/2012	8615079	0.0574	30	25	741.9	36.1	0.951	1.237	1.209	23.79	1725	33	0.017
9/27/2012	8615050	0.0440	14	19	747.2	35.4	0.953	1.228	1.231	23.63	1745	25	0.008

Valid Samples: 8 8

Monthly Average: 38 0.030

Scheduled Samples: 8 8

Standard Deviation: 12 0.025

Percent Data Captured: 100% 100%

Maximum: 65 0.078

Minimum: 25 0.008

### NOTES

### DEFINITIONS and CALCULATIONS

$T_{av}$  = average temperature in degrees Celcius

$Q_a$  = look up table volumetric flow rate

$P_{av}$  = average station pressure in millimeters of mercury

$Q_{std}$  = total sample volumetric flow rate corrected to standard conditions

$P_f$  =  $((\text{Temp in } ^\circ\text{Kelvin} * \text{Temp Slope}) + \text{Temp Int}) * 1.868$

$V_{std}$  = total sample volume corrected to standard conditions

$P_f = ((\text{Temp in } ^\circ\text{Kelvin} * 0.0684) + (-0.4213)) * 1.868$

TSP = mass concentration in  $\mu\text{g}/\text{std m}^3$

$P_f/P_{av}$  = pressure ratio of  $P_f$  and  $P_{av}$  =  $1 - P_f/P_{av}$

Lead = mass concentration in  $\mu\text{g}/\text{std m}^3$



# PM<sub>10</sub> Analysis

The Doe Run Company

Big River Site #4- Primary																							
SAMPLER ID	P2952	Sample Date	Filter ID	PM10 Filter Net Wt.	T <sub>av</sub> C	P <sub>av</sub> mmHg	P <sub>f</sub> mmHg	Ratio P <sub>f</sub> /P <sub>a</sub>	Q <sub>a</sub> m <sup>3</sup> /min	Q <sub>std</sub> m <sup>3</sup> /min	Elapsed Time hr	Sample Volume V <sub>std</sub> m <sup>3</sup>	Mass Conc. PM <sub>10</sub> µg/m <sup>3</sup>										
9/6/2012	264045	0.0334	24	742.5	36.0	0.952	1.149	1.127	23.69	1602	21												
9/9/2012	264034	0.0117	17	745.9	35.1	0.953	1.138	1.149	23.67	1632	7												
9/12/2012	264025	0.0344	20	748.1	35.6	0.952	1.144	1.144	23.61	1620	21												
9/15/2012	264015	0.0195	16	749.8	35.0	0.953	1.137	1.158	23.63	1642	12												
9/18/2012	264007	0.0160	14	744.1	34.8	0.953	1.134	1.153	23.66	1636	10												
9/21/2012	280997	0.0253	19	741.5	35.4	0.952	1.141	1.136	4.55	310	INVALID												
9/24/2012	280987	0.0308	14	747.7	34.8	0.953	1.134	1.159	23.92	1663	19												
9/27/2012	280977	0.0237	19	747.2	35.4	0.953	1.142	1.145	23.66	1625	15												
9/30/2012	280969	0.0338	15	742.0	34.9	0.953	1.136	1.147	23.63	1626	21												
Valid Samples: 8				Monthly Average: 16																			
Scheduled Samples: 9				Standard Deviation: 6																			
Percent Data Captured: 89%				Maximum: 21																			
				Minimum: 7																			
NOTES																							
9/3/2012 - Holiday - No samples scheduled																							
9/21/2012 - INVALID - Mechanical Failure																							
DEFINITIONS and CALCULATIONS																							
T <sub>av</sub> = average temperature in degrees Celcius							P <sub>f</sub> /P <sub>a</sub> = pressure ratio of P <sub>f</sub> and P <sub>av</sub> = 1 - P <sub>f</sub> /P <sub>av</sub>																
P <sub>av</sub> = average station pressure in millimeters of mercury							Q <sub>a</sub> = look up table volumetric flow rate																
P <sub>f</sub> = ((Temp in °Kelvin * Temp Slope))+Temp Int.)*1.868							Q <sub>std</sub> = sample volumetric flow rate corrected to standard conditions																
P <sub>f</sub> = ((Temp in °Kelvin * 0.0664)+(-0.4213))*1.868							V <sub>std</sub> = sample volume corrected to standard conditions																



## PM<sub>10</sub> Analysis

The Doe Run Company

Elvins Rivermines Site #1 by Office											
SAMPLER ID	P4601	PM10 Filter Net Wt.	T <sub>av</sub>	P <sub>av</sub>	P <sub>f</sub>	Ratio	Q <sub>a</sub>	Q <sub>std</sub>	Elapsed Time	Sample Volume V <sub>std</sub>	Mass Conc. PM <sub>10</sub> μg/m <sup>3</sup>
Sample Date	Filter ID	g	C	mmHg	mmHg	P <sub>o</sub> /P <sub>a</sub>	m <sup>3</sup> /min	m <sup>3</sup> /min	hr	m <sup>3</sup>	μg/m <sup>3</sup>
9/6/2012	264048	0.0269	24	742.5	36.0	0.952	1.121	1.100	23.62	1559	17
9/9/2012	264037	0.0123	17	745.9	35.1	0.953	1.111	1.121	23.56	1585	8
9/12/2012	264028	0.0263	20	748.1	35.6	0.952	1.117	1.117	23.54	1577	17
9/15/2012	264018	0.0184	16	749.8	35.0	0.953	1.110	1.130	23.58	1599	12
9/18/2012	264010	0.0597	14	744.1	34.8	0.953	1.107	1.125	23.63	1595	37
9/21/2012	281000	0.0259	19	741.5	35.4	0.952	1.114	1.109	23.86	1588	16
9/24/2012	280990	0.0456	14	747.7	34.8	0.953	1.107	1.131	23.59	1601	28
9/27/2012	280980	0.0085	19	747.2	35.4	0.953	1.115	1.118	10.19	683	INVALID
9/30/2012	280972	0.0369	15	742.0	34.9	0.953	1.108	1.119	23.67	1590	23
Valid Samples:	8										Monthly Average: 20
Scheduled Samples:	9										Standard Deviation: 10
Percent Data Captured:	89%										Maximum: 37
											Minimum: 8

**NOTES**  
9/3/2012 - Holiday - No samples scheduled  
9/27/2012 - INVALID - Electrical Failure Due to Weather

**DEFINITIONS and CALCULATIONS**

T<sub>av</sub> = average temperature in degrees Celcius  
P<sub>av</sub> = average station pressure in millimeters of mercury  
P<sub>f</sub> = ((Temp in °Kelvin \* Temp Slope))+Temp Int.)\*1.868  
P<sub>f</sub> = ((Temp in °Kelvin \* 0.0664)+(-0.4213))\*1.868

P<sub>o</sub>/P<sub>a</sub> = pressure ratio of P<sub>f</sub> and P<sub>av</sub> = 1 - Pf/P<sub>av</sub>  
Q<sub>a</sub> = look up table volumetric flow rate  
Q<sub>std</sub> = sample volumetric flow rate corrected to standard conditions  
V<sub>std</sub> = sample volume corrected to standard conditions



## PM<sub>10</sub> Analysis

The Doe Run Company

Sampler ID P4507			Elvins Rivermines Site #2 Wood & Barton								
Sample Date 2012	Filter ID	PM10 Filter Net Wt. g	T <sub>av</sub> C	P <sub>av</sub> mmHg	P <sub>f</sub> mmHg	Ratio P <sub>f</sub> /P <sub>a</sub>	Q <sub>a</sub> m <sup>3</sup> /min	Q <sub>std</sub> m <sup>3</sup> /min	Elapsed Time hr	Sample Volume V <sub>std</sub> m <sup>3</sup>	Mass Conc. PM <sub>10</sub> μg/m <sup>3</sup>
9/6/2012	264046	0.0295	24	742.5	36.0	0.952	1.141	1.120	23.86	1603	18
9/9/2012	264035	0.0113	17	745.9	35.1	0.953	1.131	1.142	23.98	1643	7
9/12/2012	264026	0.0257	20	748.1	35.6	0.952	1.137	1.137	23.91	1632	16
9/15/2012	264016	0.0187	16	749.8	35.0	0.953	1.130	1.151	23.90	1651	11
9/18/2012	264008	0.0096	14	744.1	34.8	0.953	1.128	1.146	23.87	1641	6
9/21/2012	280998	0.0302	19	741.5	35.4	0.952	1.135	1.129	24.03	1628	19
9/24/2012	280988	0.0331	14	747.7	34.8	0.953	1.128	1.152	24.05	1663	20
9/27/2012	280978	0.0281	19	747.2	35.4	0.953	1.135	1.138	23.89	1631	17
9/30/2012	280970	0.0385	15	742.0	34.9	0.953	1.129	1.140	23.98	1640	23
Valid Samples:	9										
Scheduled Samples:	9										
Percent Data Captured:	100%										
Monthly Average:	15										
Standard Deviation:	6										
Maximum:	23										
Minimum:	6										

### NOTES

9/3/2012 - Holiday - No samples scheduled

Filter Blank	Nominal Airflow	Tolerance $\pm$ μm <sup>3</sup>
9/28/2012	280954	-0.0008

### DEFINITIONS and CALCULATIONS

T<sub>av</sub> = average temperature in degrees Celcius

P<sub>av</sub> = average station pressure in millimeters of mercury

P<sub>f</sub> = ((Temp in °Kelvin \* Temp Slope)+Temp Int.)\*1.868

P<sub>f</sub> = ((Temp in °Kelvin \* 0.0664)+(-0.4213))\*1.868

P<sub>f</sub>/P<sub>a</sub> = pressure ratio of P<sub>f</sub> and P<sub>av</sub> = 1 - P<sub>f</sub>/P<sub>av</sub>

Q<sub>a</sub> = look up table volumetric flow rate

Q<sub>std</sub> = sample volumetric flow rate corrected to standard conditions

V<sub>std</sub> = sample volume corrected to standard conditions



## PM<sub>10</sub> Analysis

The Doe Run Company

Elvins Rivermines Site #3 WTP											
Sampler ID P2951		PM10 Filter Net Wt.	T <sub>av</sub>	P <sub>av</sub>	P <sub>t</sub>	Ratio P <sub>o</sub> /P <sub>a</sub>	Q <sub>a</sub>	Q <sub>std</sub>	Elapsed Time hr	Sample Volume V <sub>std</sub> m <sup>3</sup>	Mass Conc. PM <sub>10</sub> µg/m <sup>3</sup>
Sample Date	Filter ID	g	C	mmHg	mmHg		m <sup>3</sup> /min	m <sup>3</sup> /min			
9/6/2012	264047	0.0291	24	742.5	36.0	0.952	1.150	1.128	23.46	1588	18
9/9/2012	264036	0.0139	17	745.9	35.1	0.953	1.140	1.150	23.48	1621	9
9/12/2012	264027	0.0256	20	748.1	35.6	0.952	1.145	1.146	23.40	1609	16
9/15/2012	264017	0.0202	16	749.8	35.0	0.953	1.138	1.159	23.47	1633	12
9/18/2012	264009	0.0101	14	744.1	34.8	0.953	1.135	1.154	23.48	1625	6
9/21/2012	280999	0.0247	19	741.5	35.4	0.952	1.143	1.137	23.67	1615	15
9/24/2012	280989	0.0303	14	747.7	34.8	0.953	1.135	1.160	23.50	1635	19
9/27/2012	280979	0.0264	19	747.2	35.4	0.953	1.144	1.146	23.43	1612	16
9/30/2012	280971	0.0333	15	742.0	34.9	0.953	1.137	1.148	23.51	1619	21
Valid Samples:	9	Scheduled Samples:	9	Percent Data Captured:	100%	Monthly Average:	15	Standard Deviation:	5	Maximum:	21
											Minimum: 6
<b>NOTES</b>											
9/3/2012 - Holiday - No samples scheduled											
<b>DEFINITIONS and CALCULATIONS</b>											
T <sub>av</sub> = average temperature in degrees Celcius											
P <sub>av</sub> = average station pressure in millimeters of mercury											
P <sub>t</sub> = ((Temp in °Kelvin * Temp Slope)+Temp Int.)*1.868											
P <sub>o</sub> = ((Temp in °Kelvin * 0.0664)+(-0.4213))*1.868											
P <sub>o</sub> /P <sub>a</sub> = pressure ratio of P <sub>t</sub> and P <sub>av</sub> = 1 - P <sub>t</sub> /P <sub>av</sub>											
Q <sub>a</sub> = look up table volumetric flow rate											
Q <sub>std</sub> = sample volumetric flow rate corrected to standard conditions											
V <sub>std</sub> = sample volume corrected to standard conditions											



# PM<sub>10</sub> Analysis

The Doe Run Company

Big River Site #4 - QA																				
SAMPLER ID	P1019																			
Sample Date	Filter ID	PM10 Filter Net Wt.	T <sub>av</sub> C	P <sub>av</sub> mmHg	P <sub>f</sub> mmHg	Ratio P <sub>o</sub> /P <sub>a</sub>	Q <sub>a</sub> m <sup>3</sup> /min	Q <sub>std</sub> m <sup>3</sup> /min	Elapsed Time hr	Sample Volume V <sub>std</sub> m <sup>3</sup>	Mass Conc. PM <sub>10</sub> µg/m <sup>3</sup>									
9/6/2012	264044	0.0367	24	742.5	36.0	0.952	1.162	1.140	23.89	1635	22									
9/12/2012	264024	0.0391	20	748.1	35.6	0.952	1.158	1.158	23.86	1657	24									
9/18/2012	264006	0.0151	14	744.1	34.8	0.953	1.147	1.166	23.58	1649	9									
9/24/2012	280986	0.0214	14	747.7	34.8	0.953	1.147	1.172	23.23	1634	13									
9/30/2012	280968	0.0355	15	742.0	34.9	0.953	1.149	1.160	23.48	1634	22									
Valid Samples: 5			Scheduled Samples: 5			Percent Data Captured: 100%			Monthly Average: 18											
									Standard Deviation: 6											
									Maximum: 24											
									Minimum: 9											
<b>NOTES</b>																				
<b>DEFINITIONS and CALCULATIONS</b>																				
T <sub>av</sub> = average temperature in degrees Celcius						P <sub>o</sub> /P <sub>a</sub> = pressure ratio of P <sub>f</sub> and P <sub>av</sub> = 1 - P <sub>f</sub> /P <sub>av</sub>														
P <sub>av</sub> = average station pressure in millimeters of mercury						Q <sub>a</sub> = look up table volumetric flow rate														
P <sub>f</sub> = ((Temp in °Kelvin * Temp Slope))+Temp Int.)*1.868						Q <sub>std</sub> = sample volumetric flow rate corrected to standard conditions														
P <sub>f</sub> = ((Temp in °Kelvin * 0.0664)+(-0.4213))*1.868						V <sub>std</sub> = sample volume corrected to standard conditions														

***Lab Results (Lead and Cadmium)***



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### ANALYSIS REPORT

**Client Information:**

Barr Engineering Company  
7390 Ohms Lane  
Edina, MN 55439-2330

**Chain of Custody No.:** 12-0962  
**Date Received:** 09/21/12  
**Analysis Method:** 40 CFR §50  
Appendix G

**Location** Elvins River  
Mines

Lab No.	Filter ID	Date	Site	µg Pb/Filter	µg Cd/Filter	Date - Analyst
124683	8611206	09/04/12	#1 South - Office	55	< 10	10/03/12 - DS
124684	8611208	09/04/12	#2 North - W&B	< 10	< 10	10/03/12 - DS
124685	8611207	09/04/12	#3 East - WTP	13	< 10	10/03/12 - DS
124686	8613997	09/05/12	#1 South - Office	110	< 10	10/03/12 - DS
124687	8613999	09/05/12	#2 North - W&B	39	< 10	09/28/12 - DS
124688	8613998	09/05/12	#3 East - WTP	17	< 10	09/28/12 - DS
124689	8613987	09/06/12	#1 South - Office	43	< 10	09/28/12 - DS
124690	8613989	09/06/12	#2 North - W&B	71	< 10	09/28/12 - DS
124691	8613988	09/06/12	#3 East - WTP	19	< 10	09/28/12 - DS
124692	8613979	09/07/12	#1 South - Office	< 10	< 10	09/28/12 - DS
124693	8613981	09/07/12	#2 North - W&B	26	< 10	09/28/12 - DS
124694	8613980	09/07/12	#3 East - WTP	< 10	< 10	09/28/12 - DS

Submitted by:

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### ANALYSIS REPORT

**Client Information:**

Barr Engineering Company  
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**Chain of Custody No.:** 12-0984  
**Date Received:** 09/27/12  
**Analysis Method:** 40 CFR §50  
Appendix G

**Location** Elvins River  
Mines

Lab No.	Filter ID	Date	Site	µg Pb/Filter	µg Cd/Filter	Date - Analyst
124817	8613969	09/10/12	#1 South - Office	36	< 10	10/03/12 - DS
124818	8613971	09/10/12	#2 North - W&B	15	< 10	10/03/12 - DS
124819	8613970	09/10/12	#3 East - WTP	15	< 10	10/03/12 - DS
124820	8613959	09/11/12	#1 South - Office	< 10	< 10	10/03/12 - DS
124821	8613961	09/11/12	#2 North - W&B	30	< 10	10/03/12 - DS
124822	8613960	09/11/12	#3 East - WTP	14	< 10	10/03/12 - DS
124823	8613950	09/12/12	#1 South - Office	11	< 10	10/03/12 - DS
124824	8613952	09/12/12	#2 North - W&B	58	< 10	10/03/12 - DS
124825	8613951	09/12/12	#3 East - WTP	32	< 10	10/03/12 - DS
124826	8613944	09/13/12	#1 South - Office	34	< 10	10/03/12 - DS
124827	8613942	09/13/12	#2 North - W&B	11	< 10	10/03/12 - DS
124828	8613943	09/13/12	#3 East - WTP	19	< 10	10/03/12 - DS
124829	8613931	09/14/12	#1 South - Office	26	< 10	10/03/12 - DS
124830	8613933	09/14/12	#2 North - W&B	11	< 10	10/03/12 - DS
124831	8613932	09/14/12	#3 East - WTP	10	< 10	10/03/12 - DS

Submitted by:

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### ANALYSIS REPORT

**Client Information:**

Barr Engineering Company  
7390 Ohms Lane  
Edina, MN 55439-2330

**Chain of Custody No.:** 12-1003  
**Date Received:** 10/05/12  
**Analysis Method:** 40 CFR §50  
Appendix G

**Location** Elvins River  
Mines

Lab No.	Filter ID	Date	Site	µg Pb/Filter	µg Cd/Filter	Date - Analyst
124901	8613921	09/17/12	#1 South - Office	191	< 10	10/09/12 - DS
124902	8613923	09/17/12	#2 North - W&B	< 10	< 10	10/09/12 - DS
124903	8613922	09/17/12	#3 East - WTP	37	< 10	10/09/12 - DS
124904	8613913	09/18/12	#1 South - Office	511	< 10	10/09/12 - DS
124905	8613915	09/18/12	#2 North - W&B	< 10	< 10	10/09/12 - DS
124906	8613914	09/18/12	#3 East - WTP	29	< 10	10/09/12 - DS
124907	8613903	09/19/12	#1 South - Office	11	< 10	10/09/12 - DS
124908	8613905	09/19/12	#2 North - W&B	184	< 10	10/09/12 - DS
124909	8613904	09/19/12	#3 East - WTP	13	< 10	10/09/12 - DS
124910	8615094	09/20/12	#1 South - Office	87	< 10	10/09/12 - DS
124911	8615096	09/20/12	#2 North - W&B	18	< 10	10/09/12 - DS
124912	8615095	09/20/12	#3 East - WTP	66	< 10	10/09/12 - DS
124913	8615088	09/21/12	#1 South - Office	20	< 10	10/09/12 - DS
124914	8615086	09/21/12	#2 North - W&B	158	< 10	10/09/12 - DS
124915	8615085	09/21/12	#3 East - WTP	21	< 10	10/09/12 - DS

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### ANALYSIS REPORT

**Client Information:**

Barr Engineering Company  
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**Chain of Custody No.:** 12-1018  
**Date Received:** 10/12/12  
**Analysis Method:** 40 CFR §50  
Appendix G

**Location** Elvins River  
Mines

Lab No.	Filter ID	Date	Site	µg Pb/Filter	µg Cd/Filter	Date - Analyst
125000	8615075	09/24/12	#1 South - Office	262	< 10	10/17/12 - DS
125001	8615077	09/24/12	#2 North - W&B	135	< 10	10/17/12 - DS
125002	8615076	09/24/12	#3 East - WTP	16	< 10	10/17/12 - DS
125003	8615065	09/25/12	#1 South - Office	35	< 10	10/17/12 - DS
125004	8615067	09/25/12	#2 North - W&B	116	< 10	10/17/12 - DS
125005	8615066	09/25/12	#3 East - WTP	31	< 10	10/17/12 - DS
125006	8615057	09/26/12	#1 South - Office	21	< 10	10/17/12 - DS
125007	8615059	09/26/12	#2 North - W&B	16	< 10	10/17/12 - DS
125008	8615058	09/26/12	#3 East - WTP	< 10	< 10	10/17/12 - DS
125009	8615046	09/27/12	#1 South - Office	< 10	< 10	10/17/12 - DS
125010	8615048	09/27/12	#2 North - W&B	< 10	< 10	10/17/12 - DS
125011	8615047	09/27/12	#3 East - WTP	< 10	< 10	10/17/12 - DS
125012	8615037	09/28/12	#1 South - Office	68	< 10	10/17/12 - DS
125013	8615024	09/28/12	#2 North - W&B	< 10	< 10	10/17/12 - DS
125014	8615039	09/28/12	#2 North - W&B	58	< 10	10/17/12 - DS
125015	8615038	09/28/12	#3 East - WTP	38	< 10	10/17/12 - DS

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### ANALYSIS REPORT

**Client Information:**

Barr Engineering Company  
7390 Ohms Lane  
Edina, MN 55439-2330

**Chain of Custody No.:** 12-0962  
**Date Received:** 09/21/12  
**Analysis Method:** 40 CFR §50  
Appendix G

**Location** Big River

Lab No.	Filter ID	Date	Site	µg Pb/Filter	µg Cd/Filter	Date - Analyst
124677	8611209	09/04/12	#4 Primary	23	< 10	10/03/12 - DS
124678	8611210	09/04/12	#4 QA	22	< 10	10/03/12 - DS
124679	8614000	09/05/12	#4 Primary	83	< 10	10/03/12 - DS
124680	8613990	09/06/12	#4 Primary	27	< 10	10/03/12 - DS
124681	8613991	09/06/12	#4 QA	28	< 10	10/03/12 - DS
124682	8613982	09/07/12	#4 Primary	< 10	< 10	10/03/12 - DS

Submitted by:

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Vandelicht  
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### ANALYSIS REPORT

**Client Information:**

Barr Engineering Company  
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Edina, MN 55439-2330

**Chain of Custody No.:** 12-0984  
**Date Received:** 09/27/12  
**Analysis Method:** 40 CFR §50  
Appendix G

**Location** Big River

Lab No.	Filter ID	Date	Site	µg Pb/Filter	µg Cd/Filter	Date - Analyst
124810	8613972	09/10/12	#4 Primary	55	< 10	10/03/12 - DS
124811	8613962	09/11/12	#4 Primary	87	< 10	10/03/12 - DS
124812	8613973	09/11/12	#4 QA	82	< 10	10/03/12 - DS
124813	8613953	09/12/12	#4 Primary	29	< 10	10/03/12 - DS
124814	8613941	09/13/12	#4 Primary	18	< 10	10/03/12 - DS
124815	8613940	09/13/12	#4 QA	18	< 10	10/03/12 - DS
124816	8613934	09/14/12	#4 Primary	21	< 10	10/03/12 - DS

Submitted by:

  
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### ANALYSIS REPORT

**Client Information:**

Barr Engineering Company  
7390 Ohms Lane  
Edina, MN 55439-2330

**Chain of Custody No.:** 12-1003  
**Date Received:** 10/05/12  
**Analysis Method:** 40 CFR §50  
Appendix G

**Location** Big River

Lab No.	Filter ID	Date	Site	µg Pb/Filter	µg Cd/Filter	Date - Analyst
124894	8613924	09/17/12	#4 Primary	22	< 10	10/09/12 - DS
124895	8613916	09/18/12	#4 Primary	85	< 10	10/09/12 - DS
124896	8613925	09/18/12	#4 QA	82	< 10	10/09/12 - DS
124897	8613906	09/19/12	#4 Primary	18	< 10	10/09/12 - DS
124898	8615097	09/20/12	#4 Primary	124	< 10	10/09/12 - DS
124899	8615100	09/20/12	#4 QA	135	< 10	10/09/12 - DS
124900	8615087	09/21/12	#4 Primary	20	< 10	10/09/12 - DS

Submitted by:

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### ANALYSIS REPORT

**Client Information:**

Barr Engineering Company  
7390 Ohms Lane  
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**Chain of Custody No.:** 12-1018  
**Date Received:** 10/12/12  
**Analysis Method:** 40 CFR §50  
Appendix G

**Location** Big River

Lab No.	Filter ID	Date	Site	µg Pb/Filter	µg Cd/Filter	Date - Analyst
124993	8615078	09/24/12	#4 Primary	28	< 10	10/17/12 - DS
124994	8615068	09/25/12	#4 Primary	28	< 10	10/17/12 - DS
124995	8615079	09/25/12	#4 QA	30	< 10	10/17/12 - DS
124996	8615060	09/26/12	#4 Primary	10	< 10	10/17/12 - DS
124997	8615049	09/27/12	#4 Primary	14	< 10	10/17/12 - DS
124998	8615050	09/27/12	#4 QA	14	< 10	10/17/12 - DS
124999	8615040	09/28/12	#4 Primary	68	< 10	10/17/12 - DS

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10/18/12

Date

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***Meteorological Data***

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